

## SPIRANTHES (ORCHIDACEAE) IN MISSISSIPPI

M. WAYNE MORRIS

Department of Botany, University of Florida,  
Gainesville, Florida 32611

**ABSTRACT.** Species of *Spiranthes* native to Mississippi include *S. cernua*, *S. lacera* var. *gracilis*, *S. laciniata*, *S. longilabris*, *S. magnicamporum*, *S. odorata*, *S. ovalis*, *S. praecox*, *S. tuberosa*, and *S. vernalis*. A brief introduction to the genus and a description of the physiographic provinces of Mississippi as it concerns the native species of *Spiranthes* are followed by a detailed discussion and key, with illustrations, partial synonymy, and habitats, of each of the native Mississippi species.

*Spiranthes* is a genus of primarily terrestrial plants of the subtribe Spiranthinae (tribe Cranichideae) (Dressler, 1981). There are 42 known species in the genus, and they principally occur in the north temperate zone, particularly in the New World (Garay, 1980). Species of *Spiranthes* commonly have either tuberous or slender, fleshy roots, usually basal, ovate to lanceolate leaves, and a spicate inflorescence bearing flowers arranged spirally (sometimes secund) along the axis. Flowers are commonly white or greenish; some are patterned with green or yellow striping or veining. Several species, such as *S. cernua*, *S. lacera* var. *gracilis*, *S. sinensis*, *S. spiralis*, and *S. vernalis*, have been grown as ornamentals (Hawkes, 1965). Flowers are reportedly pollinated by bumblebees, halictid and megachilid bees (Dressler, 1981). *Bombus americanorum* (Apidae), *Calliopsis andreniformis* (Andrenidae), and *Megachile brevis* (Megachilidae) have been observed on *S. lacera* var. *gracilis* (van der Pijl & Dodson, 1966), and *Bombus americanorum* and *Apis mellifera* (both in the Apidae) have been shown to be the pollinators of *S. odorata* and *S. vernalis*, respectively (Catling, 1983b).

Ten species of *Spiranthes* are known from Mississippi, a state in the southeastern United States bounded by the Gulf of Mexico and Louisiana to the south and the Mississippi River to the west. The state is divided into ten physiographic regions, or land resource areas (Lowe, 1921): the Tennessee River Hills (TRH), Black Prairie (BP), Pontotoc Ridge (PR), Interior Flatwoods (IF), North Central Plateau (NCP), Loess Bluffs (LB), Delta (D), Jackson Prairie (JP), Longleaf Pine Belt (LPB), and Coastal Pine Meadows (CPM) (FIGURE 1). Soil differences, especially pH, water-retaining capacity, and percentage of humus, have a significant effect on plant species composition among the different regions. Relief influences plant community composition, but not nearly to the extent of the communities in other southeastern states influenced by the Appalachian Mountain Chain. The highest point in Mississippi is only 806 ft (ca. 244 m) above sea level.

The *Spiranthes* species found in Mississippi include *S. cernua*, *S. lacera* var. *gracilis*, *S. laciniata*, *S. longilabris*, *S. magnicamporum*, *S. odorata*, *S. ovalis*, *S. praecox*, *S. tuberosa*, and *S. vernalis*. FIGURE 2 shows the distribution of the species in the state. *Spiranthes vernalis* and *S. tuberosa* are the most common and widely distributed of the species. *Spiranthes cernua* is frequent in boggy places in the northern half of the state, excluding the Delta and Black Prairie regions, and it is apparently rare in the south. *Spiranthes praecox* is characteristic of the Longleaf Pine Belt and Coastal Pine Meadows, and it is locally abundant in savannas and wet meadows in these regions. *Spiranthes lacera* var. *gracilis* has an unusual distribution pattern in that it occurs sporadically over a wide area from the Pontotoc Ridge and North Central Plateau regions to the Loess Bluff and Longleaf Pine Belt regions. It is usually rare in a given area, with only one collection (two in the North Central Plateau) representing its presence in each region. The general habitat preference in Mississippi of *S. lacera* var. *gracilis*, meadows and deciduous woodlands, however, is similar to sites recorded for this species in its distribution outside of Mississippi (McGregor et al., 1986).

The other five species are more restricted to certain regions of the state than those species noted above, and some are considered rare. *Spiranthes laciniata* and *S. longilabris* are known primarily from the Coastal Pine Meadows. However, in the field, *S. laciniata* is easily overlooked among colonies of the other two more common spring-blooming species in the southern part of the state—*S. praecox* and *S. vernalis*. *Spiranthes magnicamporum* is limited to calcareous soils, particularly to the Black Prairie region. *Spiranthes odorata* is only known from a few swamps and marshes in the Longleaf Pine Belt and Coastal Pine Meadows. *Spiranthes ovalis* is mainly reported from bottomland hardwood forests of the Delta (Carter, 1978; Morris, 1988) and low, rich woods and woodland margins in the Tennessee River Hills. This species is apparently rare

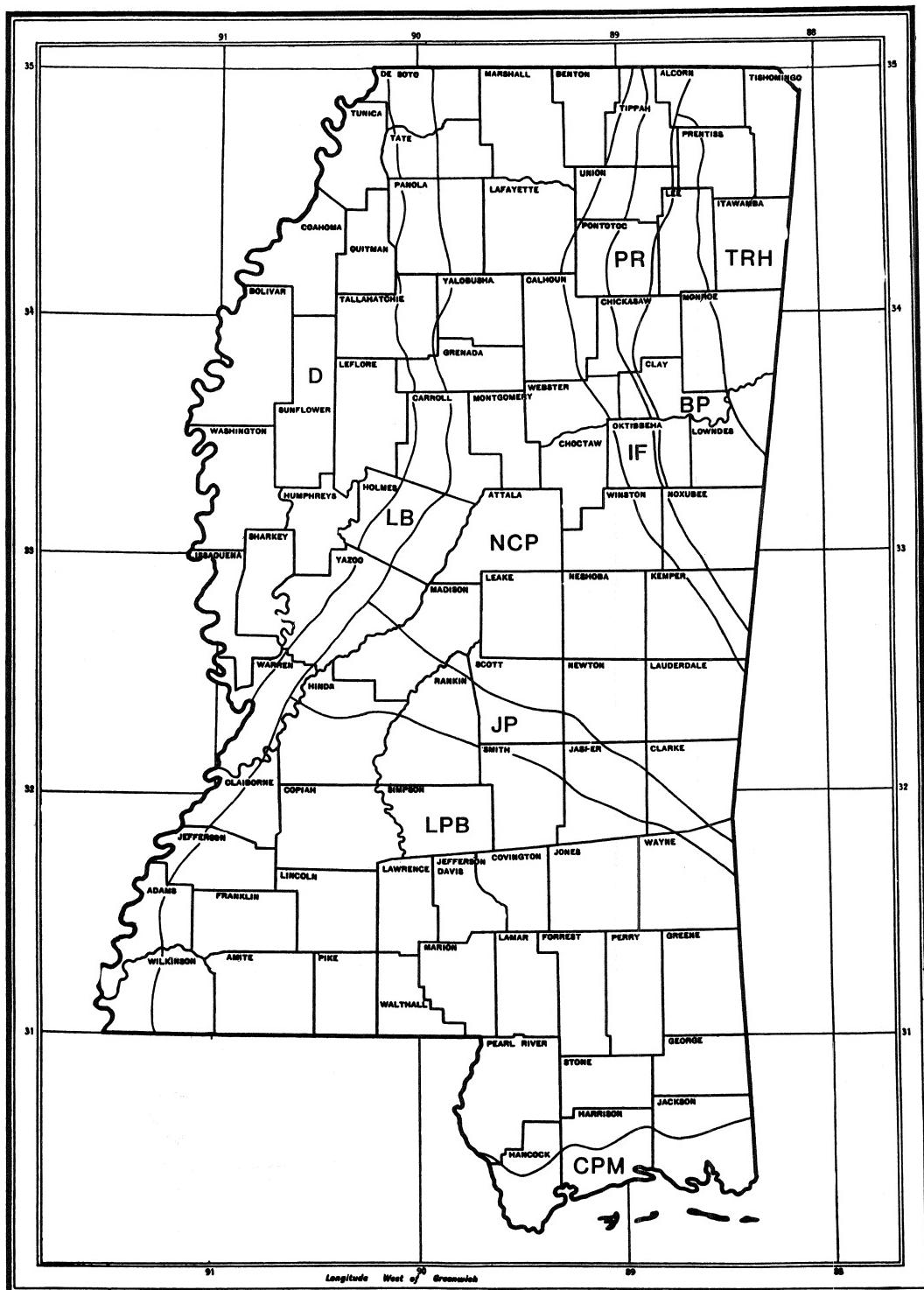


FIGURE 1. Physiographic regions, or land resource areas, of Mississippi (adapted from Lowe, 1921) (THR = Tennessee River Hills; BP = Black Prairie; PR = Pontotoc Ridge; IF = Interior Flatwoods; NCP = North Central Plateau; LB = Loess Bluffs; D = Delta; JP = Jackson Prairie; LPB = Longleaf Pine Belt; CPM = Coastal Pine Meadows).

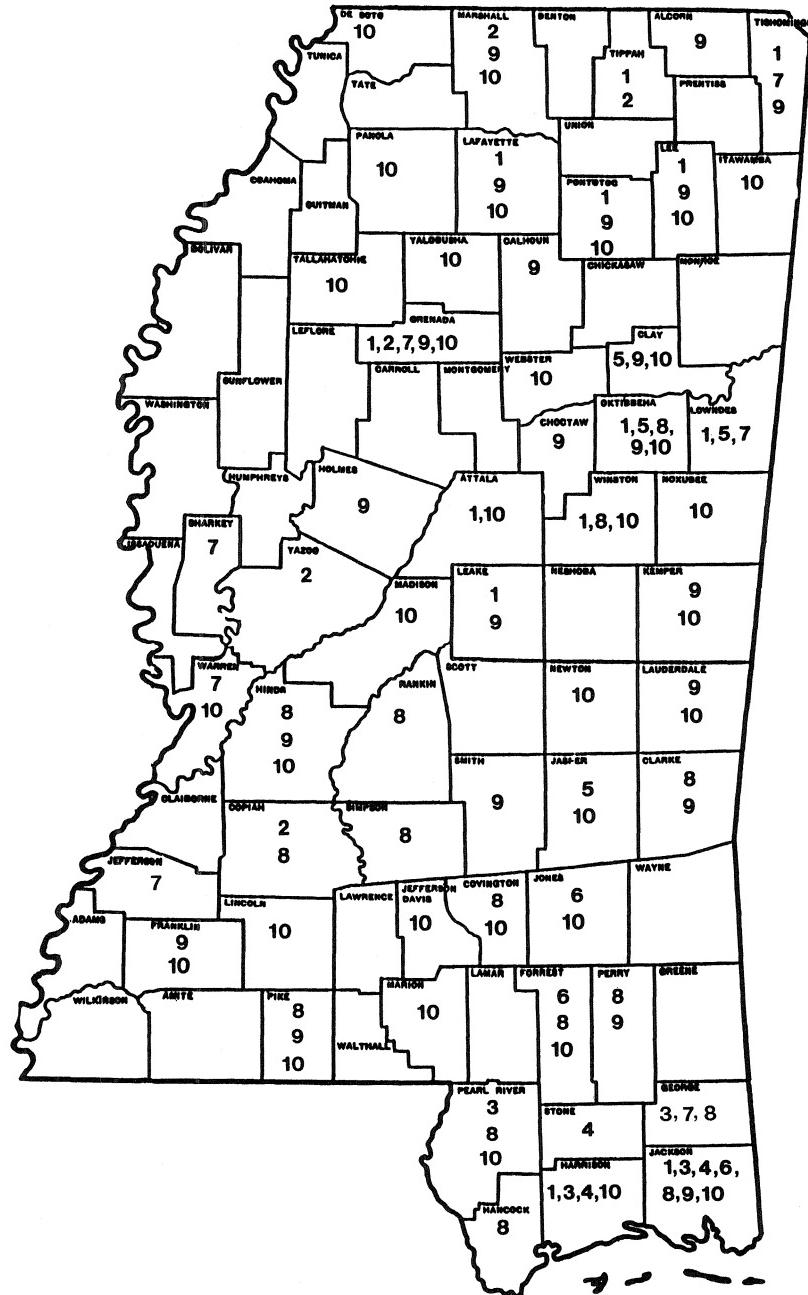


FIGURE 2. Distribution of species of *Spiranthes* in Mississippi (1 = *S. cernua*; 2 = *S. lacera* var. *gracilis*; 3 = *S. laciniata*; 4 = *S. longilabris*; 5 = *S. magnicamporum*; 6 = *S. odorata*; 7 = *S. ovalis*; 8 = *S. praecox*; 9 = *S. tuberosa*; 10 = *S. vernalis*).

throughout most of its range in the southeastern United States (Steyermark, 1963; Radford et al., 1968), and it is commonly associated with dense, old-growth forests. At the periphery of its range northward, in Illinois and southwestern Michigan,

however, *S. ovalis* occupies disturbed sites in woods (Case & Catling, 1983), which suggests the species may be extending its range northward.

In addition to the ten species known in the

state, it is possible that *Spiranthes brevilabris* Lindley (including both var. *brevilabris* and var. *floridana* (Wherry) Luer), a species with basal, persistent, ovate leaves and a lip with a yellow center, occurs in Mississippi (Sheviak, pers. comm.). Luer (1972) indicates it should be present in the extreme southern part of the state. The author of this paper believes *S. brevilabris* has been overlooked thus far in the Coastal Pine Meadows among the other spring-blooming species of *Spiranthes* known to occur in the area.

Specimens examined in this study are in the following herbaria: Institute for Botanical Exploration (IBE), University of Mississippi (MISS), Mississippi State University (MISSA), and the U.S. National Herbarium (us).

The following floristic manuals pertaining to the southeastern United States were considered for synonymy in this paper: Robinson and Fernald (1908), Small (1933), Radford et al. (1968), Steyermark (1963), Correll and Johnston (1970), and Godfrey and Wooten (1979). Full synonymy is found in Luer (1972, 1975).

#### GENUS DESCRIPTION AND KEY TO THE SPECIES IN MISSISSIPPI

##### SPIRANTHES Richard, Ladies'-tresses

Glabrous to pubescent erect perennial herbs with tuberous or occasionally fibrous roots; plants terrestrial, rarely semi-aquatic. Leaves simple, alternate, mostly basal, ovate to linear, persistent to fugacious, becoming reduced bracts toward the top of the plant. Inflorescence a spike, spiraled with flowers in one to several ranks or occasionally secund. Flowers white, or white marked with green or yellow; dorsal sepal and petals adherent over the column; lateral sepals free; lip sessile or attached by a short claw, usually with a tuberosity of varying proportions on each side of the base, apex of lip spreading or arcuate-recurved, crisped, wavy, or toothed; column usually short, sometimes elongate, terete or thickened toward the apex; anther deciduous on the back of the apex of the column, 2-celled; pollinia 2, cleft and granular, attached to viscid gland set in pointed rostellum by their apices, rostellum deeply cleft after removal of the gland. Fruit an erect, ellipsoid to ovoid capsule.

1. Plant at anthesis in spring and/or summer (April–August).
2. Flowers less than 4 mm long; plants glabrous. .... 9. *S. tuberosa*.
2. Flowers greater than 4 mm long; plants pubescent.
3. Pubescent with pointed hairs; spike densely pubescent. .... 10. *S. vernalis*.
3. Pubescent with glandular or capitate hairs;

spike usually moderately pubescent, infrequently densely pubescent or glabrate.

4. Flowers usually with green veining (sometimes white) on the lip; lip broadest toward the apex. .... 8. *S. praecox*.
4. Flowers usually without green veining on the lip; lip broadest toward the base. .... 3. *S. laciniata*.

1. Plant at anthesis in autumn (September–November).
  5. Flowers mostly less than 6 mm long; if slightly longer, with broad green longitudinal stripe in center of lip.
    6. Flowers with a green longitudinal stripe, usually drying dark, in the center of the lip. .... 2. *S. lacera* var. *gracilis*.
    6. Flowers without a green longitudinal stripe in the center of the lip.
      7. Leaves basal, oblanceolate, and sheathing the lower part of the inflorescence axis at anthesis; profile of spike oval; plant of moist habitats. .... 7. *S. ovalis*.
      7. Leaves strictly basal, ovate, and absent at anthesis; profile of spike not oval; plant of dry habitats. .... 9. *S. tuberosa*.
    5. Flowers 6 mm or more long; without broad green longitudinal stripe in center of lip.
      8. Flowers in a single spiral rank or secund; plant of Coastal Pine Meadows. .... 4. *S. longilabris*.
      8. Flowers in several spiral ranks; plant of regions other than or including the Coastal Pine Meadows.
        9. Lateral sepals conspicuously spreading (free) and/or ascending; leaves absent at anthesis; plant of dry to mesic calcareous soil. .... 5. *S. magnicamporum*.
        9. Lateral sepals not conspicuously spreading; leaves commonly present at anthesis; plants of wet habitats.
          10. Leaves basal and extending up a large portion of the inflorescence axis; lip broadly ovate; plant of very wet habitats (i.e., margins of cypress swamps in southern Mississippi). .... 6. *S. odorata*.
          10. Leaves basal, absent, or only on the lower part of the inflorescence axis; lip oblong; plant of bogs, wet meadows, and moist woods over much of the state. .... 1. *S. cernua*.

1. *S. cernua* (L.) Richard, Nodding Ladies'-tresses, Common Ladies'-tresses

FIGURE 3A.

Plant erect, to 50 cm tall, inflorescence axis pubescent above, becoming glabrous toward the base, hairs capitate. Leaves mostly basal, linear to linear-oblanceolate, reduced and becoming bracts above, usually absent at anthesis, 4.5–20 cm long, 5–20 mm wide. Spike profusely flowered in more than one rank, tight. Flowers 6–12 mm long, white, nodding, pubescent; lip ovate-

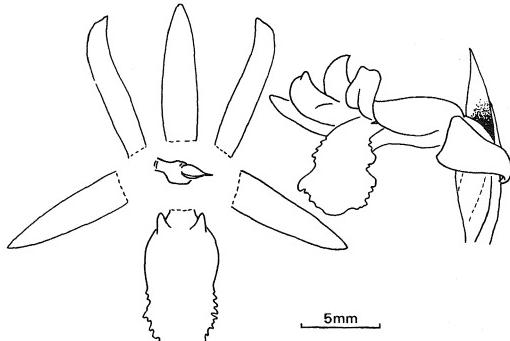
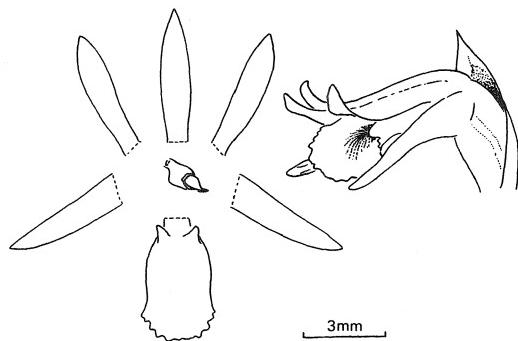
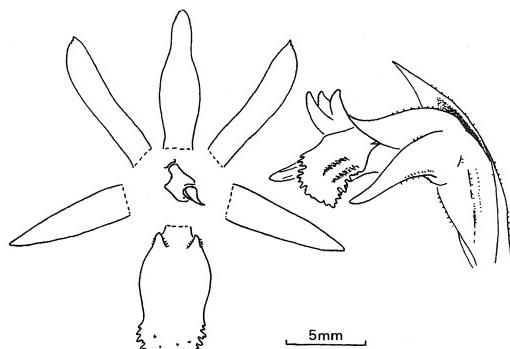
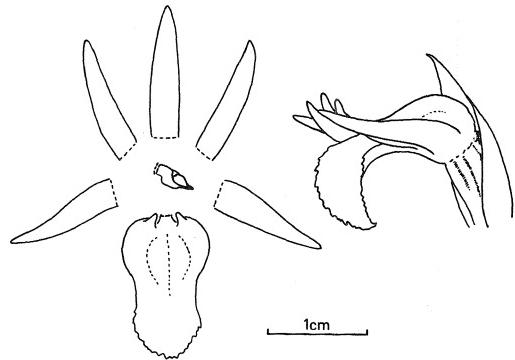


FIGURE 3. A, *Spiranthes cernua*. B, *Spiranthes lacera* var. *gracilis*.

oblong to oblong, constricted at the middle; lateral sepals usually appressed to other floral parts. Sep.-Nov. Bogs, wet meadows, moist woods and grasslands; essentially throughout MS, excluding the Delta; most frequent in NCP and TRH. (Nova Scotia to MN and se SD, s to FL and TX; NM) *Ibidium cernuum* (L.) House.

Shrub bogs and springs are favored habitats of *Spiranthes cernua*, especially in places where the canopy is at least partially open. The species may form large colonies in these situations, but it also occurs less commonly in old, moist to wet fields. Common thicket-forming shrubs in its habitat include *Viburnum nudum*, *Aronia arbutifolia*, *Rhododendron canescens*, *Vaccinium fuscum*, *Ilex verticillata*, *Alnus serrulata*, and *Rhus vernix*, and the tree-sized *Magnolia virginiana* may be present in large stands. Orchid companions include *Platanthera ciliaris*, *P. clavellata*, *P. cristata*, and *Calopogon tuberosus*. Other frequently associated herbs are *Rhynchospora glomerata*,

FIGURE 4. A, *Spiranthes laciniata*. B, *Spiranthes longilabris*.

*Trisetum pensylvanicum*, *Carex* spp., *Fuirena squarrosa*, *Xyris torta*, *Juncus* spp., *Solidago patula*, *Cacalia lanceolata*, *Lysimachia lanceolata*, *Gentiana saponaria*, *Bartonia paniculata*, *Oxybaphus rigidior*, *Eryngium integrifolium*, *Viola primulifolia*, and *Rhexia virginica*. Nodding ladies'-tresses is probably more widespread in Mississippi than collections indicate, but it is clearly a commonly encountered species in the northern part of the state (see FIGURE 2).

2. *S. lacera* (Raf.) Raf. var. *gracilis* (Bigel.) Luer,  
Slender Ladies'-tresses FIGURE 3B.

Plant slender, to 60 cm tall, essentially glabrous throughout to sparsely pubescent above. Roots fleshy, fasciculate. Leaves basal, ovate, 2–5 cm long, 1–2 cm wide, usually absent at anthesis, reduced to bracts above. Spike elongate, slender, loosely to tightly spiraled, sometimes secund. Flowers 4–7 mm long, white with a green

longitudinal stripe in the center of the lip. Sep.–Oct. Rich to dry woods, old fields, and meadows; uncommon; Copiah, Grenada, Marshall, Tip-pah, and Yazoo Cos. (ME to s MI and e KS, s to n FL and e TX) *Ibidium gracile* (Bigel.) House; *S. gracilis* (Bigel.) Beck.

Despite its wide range of habitats in Mississippi, *Spiranthes lacera* var. *gracilis* is sparingly collected and is apparently quite rare. The habitat in Grenada County, where the author has seen it, is a rich deciduous woods in close proximity to a pasture with *Acer rubrum*, *Liriodendron tulipifera*, *Carya cordiformis*, *Juglans nigra*, *Prunus serotina*, and *Quercus rubra* in the over-story. An associated orchid at this site is *Platanthera lacera*. Elsewhere in Mississippi and the eastern United States, however, more xeric sites seem to be preferred.

**3. *S. laciniata* (Small) Ames, Lace-lip Ladies'-tresses**

FIGURE 4A.

Plant to over 70 cm tall, usually moderately to densely pubescent with capitate hairs above, becoming glabrous below. Leaves linear-lanceolate to narrowly oblanceolate, 3–25 cm long, 3–10 mm wide, reduced above becoming bracts, usually present at anthesis. Spike tightly spiraled to secund, usually moderately pubescent with capitate hairs. Flowers white with yellow centers, usually pubescent, 6–10 mm long; lip broadest toward the base, usually without green veining, apex of lip commonly deeply fringed. May. Bogs, marshes, and savannas; rare; George, Harrison, Jackson, and Pearl River Cos. (NJ, s to FL, w along Gulf Coast to se TX) *Ibidium laciniatum* (Small) House; *S. × laciniata* (Small) Ames.

*Spiranthes laciniata* is presumably a rare occupant of the wet savannas and pitcher-plant bogs of extreme southern Mississippi, where it occurs with the similar species *S. praecox* and *S. vernalis* and the other orchids *Pogonia ophioglossoides*, *Calopogon* spp., *Platanthera* spp., and *Cleistes divaricata*. Intensive fieldwork in the Coastal Pine Meadows will likely result in the discovery of new localities for the lace-lip ladies'-tresses.

**4. *S. longilabris* Lindley, Giant Spiral-orchid**

FIGURE 4B.

Plant erect, slender, to 60 cm tall, essentially glabrous throughout. Leaves basal, linear to narrowly lanceolate, 3–10 cm long, 1–5 mm wide, usually absent at anthesis. Spike in a single spiral rank or secund. Flowers 6–10 mm long, white or creamy white, conspicuously ringent, projecting nearly perpendicular from the inflorescence axis, 6–10 mm long. Oct.–Nov. Wet savannas, marshes, and wet grassy meadows near the coast; rare;

Harrison, Jackson, and Stone Cos. (e VA, s to FL, and w to se TX) *Ibidium longilabre* (Lindl.) House.

The latest flowering *Spiranthes* in Mississippi is *S. longilabris*, which reaches its peak bloom in mid-November. It grows in the wet acid, peaty soils of the savannas in extreme southeastern Mississippi. In this habitat, which is heavily influenced by periodic fires, most of the vegetation is herbaceous with scattered individuals of the fire-adapted longleaf pine (*Pinus palustris*) and slash pine (*Pinus elliottii*). Species of the genera *Sarracenia*, *Drosera*, *Pinguicula*, *Xyris*, *Eriocaulon*, *Rhynchospora*, *Panicum*, *Zigadenus*, *Aletris*, *Polygala*, and *Rhexia* share the habitat with the rare *S. longilabris* as well as the orchids *Platanthera blephariglottis*, *P. cristata*, *P. integrifolia*, and *P. nivea*, among others.

**5. *S. magnicamporum* Sheviak, Great Plains Ladies'-tresses**

FIGURE 5A.

Plant erect, to 60 cm tall, inflorescence axis pubescent above, hairs capitate. Leaves basal, linear-lanceolate to oblanceolate, 14–16 cm long, 10–15 mm wide, absent at anthesis, leaves reduced to few bracts on the inflorescence axis. Spike profusely flowered in several ranks, tight. Flowers white to cream, 6–13 mm long; lateral sepals spreading and/or ascending; base and apex of lip not dilated as much as in *S. cernua*. Sep.–Oct. Prairies, calcareous bluffs, and chalk outcrops; Clay, Jasper, Lowndes, and Oktibbeha Cos. (IN to ND, s to AL, MS, and NM; locally eastward to Ontario, PA, KY, and GA) This species is presumably rare in MS. Fresh material is especially desirable to discern *S. magnicamporum* from *S. cernua*. Plants from the Loess Bluff region appear intermediate between the two species. The following character has been used to distinguish *S. magnicamporum* from *S. cernua* (Sheviak, 1982): monoembryonic seeds and the embryo enclosed within the testa for *S. magnicamporum* and polyembryonic seeds (at least in part) or monoembryonic seeds commonly with extruding embryos for *S. cernua*.

Remnant prairies in the northeastern part of the state, where chalk is exposed, provide the best habitats in Mississippi for *Spiranthes magnicamporum*. Occurring with scattered plants of *S. magnicamporum* are other indicative species of calcareous soil such as *Silphium laciniatum*, *S. terebinthinaceum*, *Eupatorium altissimum*, *Aster novae-angliae*, *Ratibida pinnata*, *Solidago rigida*, *Petalostemon candidum*, and *P. purpureum*. Although few collections of Great Plains ladies'-tresses have been made in Mississippi, it is probably not as rare as is believed.

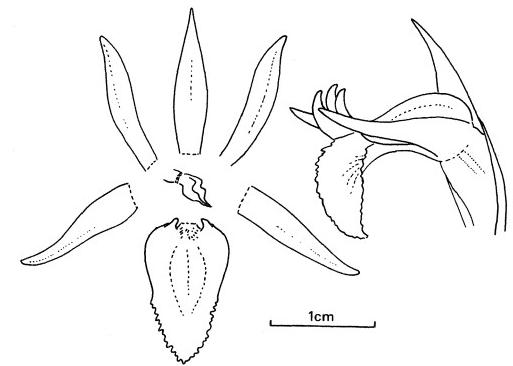
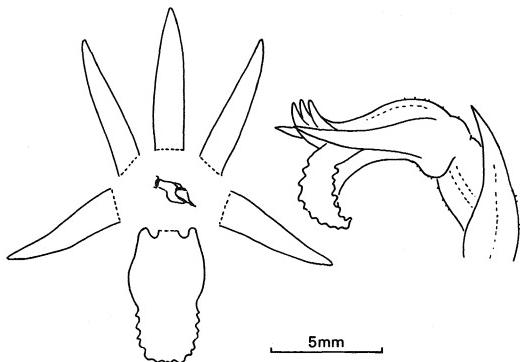
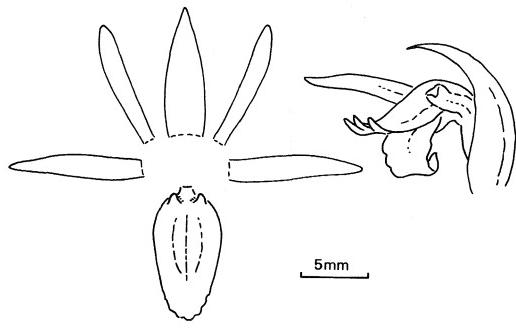


FIGURE 5. A, *Spiranthes magnicamporum*. B, *Spiranthes odorata*.

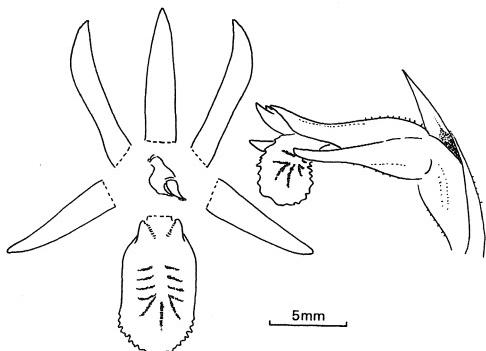


FIGURE 6. A, *Spiranthes ovalis*. B, *Spiranthes prae-cox*.

6. *S. odorata* (Nutt.) Lindley, Fragrant Ladies'-tresses

FIGURE 5B.

Plant erect, usually stout, to 70 cm or more tall, inflorescence axis pubescent above, hairs capitate. Roots fasciculate, horizontally spreading, stoloniferous. Leaves basal and extending up a large portion of the inflorescence axis, persistent, up to 30 cm long, usually 7.5–25 mm wide. Spike floriferous in more than one vertical rank, dense. Flowers fragrant, white to creamy white, 6–15 mm long; lip broadly ovate, center often yellow or yellowish; lateral sepals oblique to curving inward. Oct. Swamps (often in standing water, rooted in mud); Forrest, Jackson, and Jones Cos. (DE, s to FL, w to e TX; KY) *S. cernua* (L.) Richard var. *odorata* (Nutt.) Correll.

*Spiranthes odorata* is primarily a plant of acidic wooded swamps, but it is also known from low salinity coastal marshes (Eleuterius & McDaniel, 1978). This is most likely another un-

dercollected species, probably due to its habitat preferences in marshy areas.

7. *S. ovalis* Lindley, Oval Ladies'-tresses

FIGURE 6A.

Plant erect, slender, to 40 cm tall, inflorescence axis pubescent above, glabrate toward the base, hairs capitate. Leaves basal and on the lower part of the inflorescence axis, oblanceolate, 3–15 cm long, 5–15 mm wide, gradually reduced to bracts above, present at anthesis. Spike slender, spiraled in more than one rank, profile oval. Flowers white, 4–5 mm long; lip ovate to ovate-oblong, narrowed or somewhat expanded apically, recurved. Sep.–Oct. Bottomland hardwood forests, terraces along streams in rich woods, and natural levees at margins of rivers and swamps; rare, most frequent in the Delta; George, Grenada, Jefferson, Lowndes, Sharkey, Tishomingo, and Warren Cos. (VA to IL and MO, s to n-cen FL

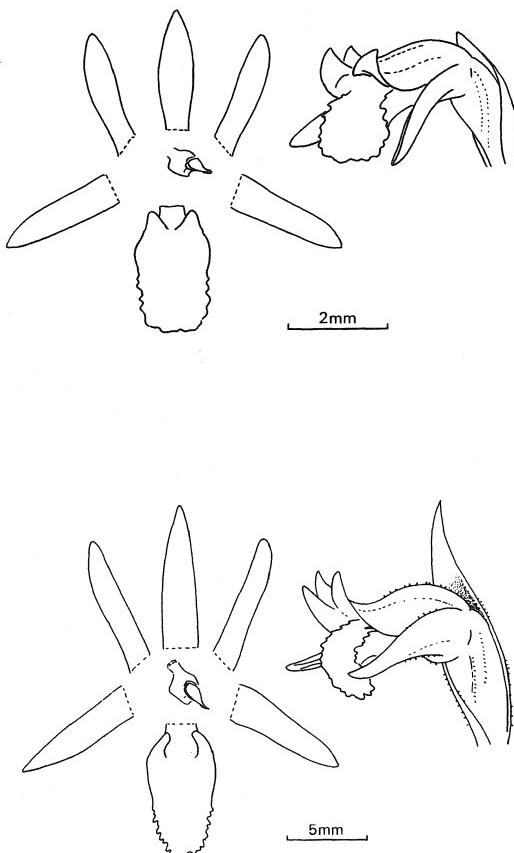


FIGURE 7. A, *Spiranthes tuberosa*. B, *Spiranthes vernalis*.

and e TX; PA, n OH, and sw MI) *Ibidium ovale* (Lindl.) House. Two varieties of *S. ovalis* are in Mississippi (Catling, 1983a). *Spiranthes ovalis* Lindley var. *ovalis* is known from Jefferson Co. in the southwestern part of the state. *Spiranthes ovalis* Lindley var. *erostellata* Catling is the most common variety in the state, and it has flowers in which a normally developed rostellum and viscidium, which are present on columns of flowers of the typical variety, are entirely lacking.

*Spiranthes ovalis* frequents bottomland hardwood forests characterized by an overstory of *Quercus michauxii*, *Q. nigra*, *Q. phellos*, *Carya ovata*, *C. illinoensis*, *Acer rubrum*, *Celtis laevigata*, *Ulmus americana*, *Fraxinus pensylvanica*, and *Liquidambar styraciflua*. Associated herbaceous plants are *Viola affinis*, *Sanicula canadensis*, *Hymenocallis occidentalis*, *Geum canadense*, and *Elephantopus carolinianus*. Oval ladies'-tresses also occurs in small stream bottoms and on gentle slopes in upland areas beneath deciduous hardwoods.

8. *S. praecox* (Walt.) S. Watson, Grass-leaved Ladies'-tresses

FIGURE 6B.

Plant to 75 cm tall, sparsely pubescent above with capitate hairs, glabrous below. Leaves mostly basal, narrowly linear to linear-lanceolate, 5–25 cm long, 1–6 mm wide, sometimes absent at anthesis. Spike strongly spiraled to almost secund, moderately to profusely flowered, some capitate hairs present. Flowers white marked with green, 5–11 mm long; lip oblong, broadest toward the apex, conspicuously veined with green in a radiating pattern (sometimes veining is white). Late Apr.–early Jun. Bogs, savannas, wet meadows, and ditches; essentially throughout the LPB and the CPM; locally northward in the NCP, the IF, and the PR to Rankin, Winston, and Oktibbeha Cos. (NJ, s to FL, w to AR and e TX) *Ibidium praecox* (Walt.) House.

A common inhabitant of pitcher-plant bogs, savannas, and other low, wet areas in the southern half of Mississippi, *Spiranthes praecox* is the earliest flowering species, often at anthesis by late April. Populations are usually quite large, and colonies of hundreds of plants may be present in a given area under favorable conditions. Herbaceous plant companions include *Sarracenia alata*, *S. leucophylla*, *S. psittacina*, *Pinguicula lutea*, *Lachnanthes caroliniana*, *Lophiola americana*, *Tofieldia racemosa*, and species of the genera *Drosera*, *Eriocaulon*, *Xyris*, *Rhynchospora*, *Panicum*, *Cyperus*, *Zigadenus*, *Polygala*, *Sabatia*, *Rhexia*, and *Ludwigia*. Associated orchids are *Calopogon tuberosus*, *C. pallidus*, *Cleistes divaricata*, *Platanthera* spp., *Pogonia ophioglossoides*, and other species of *Spiranthes*.

9. *S. tuberosa* Rafinesque, Little Ladies'-tresses, Little Pearl-twist

FIGURE 7A.

Plant very slender, rarely more than 45 cm tall, glabrous throughout, usually produced from a single tuberous root. Leaves basal, ovate, to 6 cm long and 2 cm wide, absent at anthesis. Spike loosely to profusely flowered, strongly spiraled to secund. Flowers minute, white, 2.5–4 mm long; lip ovate, the apex rounded, somewhat crisped. May–Oct., usually Jun.–Aug. Dry woods, usually pine or mixed hardwood-pine, also well-drained sandy fields in uplands; essentially throughout MS, excluding the Delta; most frequent in NCP, PR, and TRH. (MA to s MI, IL, and MO, s to cen FL and e TX) *Ibidium beckii* (Lindl.) House; *S. beckii* Lindl.; *S. grayi* Ames.

*Spiranthes tuberosa* is frequently encountered in small clearings on sandy pine-oak-hickory ridges where it occurs with *Dianthonia sericea*, *Gymnopogon ambiguus*, *Sporobolus junceus*, *Aster concolor*, *Pityopsis graminifolia*, *Liatris*

*squarrosa*, *Desmodium ciliare*, *D. laevigatum*, *D. marilandicum*, *Lespedeza hirta*, *L. stuevei*, *Tephrosia virginiana*, *Polygala incarnata*, *Aureolaria pectinata*, and species of the genera *Panicum*, *Eupatorium*, *Helianthus*, and *Solidago*. It may even colonize pine plantations and well drained road shoulders in uplands and appears to grow best in the seemingly harshest environments to which orchids could be subjected.

10. **S. vernalis** Engelmann & Gray, Spring Ladies'-tresses

FIGURE 7B.

Plant stout or slender, to over 70 cm tall, densely pubescent above with pointed hairs. Leaves basal to extending up the lower part of the inflorescence axis, linear-lanceolate, to 25 cm long and 1 cm wide, reduced to bracts above. Spike profusely flowered, spiraled or secund, densely pubescent with rusty, pointed hairs. Flowers white to yellowish, 5–11 mm long; lip broadly ovate to ovate-oblong, apex rounded, undulating, crenulate, recurved, pubescent. May–Jul. Bogs, wet meadows, marshes, ditches, beaches, pastures, and even lawns; essentially throughout MS, excluding the w Delta. (Quebec and MA, s to FL, w to NB, KA, OK, and NM; Mexico and Guatemala) *Ibidium vernale* (Engelm. & Gray) House.

The most common ladies'-tresses in Mississippi is *Spiranthes vernalis*, which is known from localities in each physiographic region. Habitats for this species vary considerably, and disturbance tends to enhance population size. *Spiranthes vernalis* colonizes borrow pits, road shoulders, pastures, and periodically mowed lawns as well as relatively undisturbed sites. It is especially common in roadside ditches, where most of its associates are grasses, sedges, and rushes.

#### ACKNOWLEDGMENTS

I thank William L. Stern, Sidney McDaniel, and Charles T. Bryson for reviewing the manuscript and making many helpful suggestions. I also appreciate comments and suggestions from Richard Carter, Robert L. Dressler, and Lorraine McDowell. Thanks are extended to Carlyle A. Luer for permitting me to use the line drawings of *Spiranthes* from *The Native Orchids of Florida* (1972) and *The Native Orchids of the United States and Canada, Excluding Florida* (1975). I appreciate the cooperation of M. B. Huneycutt and Michelle B. Nelson for lending specimens from MISS. I also thank Linda Hollenberg and the staff at us, and I am very grateful to reviewers Paul Catling and Charles Sheviak for their constructive criticism and suggestions. The key and species

descriptions of *Spiranthes* are a contribution by the author to the forthcoming *Flora of Mississippi* under the editorship of Sidney McDaniel.

#### LITERATURE CITED

- CARTER, J. R., JR. 1978. A floristic study of the Delta National Forest and adjacent areas. Master's thesis, Dept. of Botany, Mississippi State Univ., Mississippi State, Mississippi.
- CASE, F. W., JR. AND P. M. CATLING. 1983. The genus *Spiranthes* in Michigan. *The Michigan Botanist* 22: 79–92.
- CATLING, P. M. 1983a. *Spiranthes ovalis* var. *erostellata* (Orchidaceae), a new autogamous variety from the eastern United States. *Brittonia* 35: 120–125.
- . 1983b. Pollination of northeastern North American *Spiranthes* (Orchidaceae). *Canadian Journal of Botany* 61: 1080–1093.
- CORRELL, D. S. AND M. C. JOHNSTON. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner, Texas.
- DRESSLER, R. L. 1981. The orchids: natural history and classification. Harvard Univ. Press, Cambridge, Massachusetts.
- ELEUTERIUS, L. N. AND S. McDANIEL. 1978. The salt marsh flora of Mississippi. *Castanea* 43: 86–95.
- GARAY, L. A. 1980. A generic revision of the *Spiranthinae*. *Botanical Museum Leaflets* 28: 278–425.
- GODFREY, R. K. AND J. W. WOOTEN. 1979. Aquatic and wetland plants of southeastern United States: monocotyledons. The Univ. of Georgia Press, Athens, Georgia.
- HAWKES, A. D. 1965. *Encyclopaedia of cultivated orchids*. Faber and Faber Ltd., London.
- LOWE, E. N. 1921. Plants of Mississippi, a list of flowering plants and ferns. *Mississippi Geological Survey Bulletin* 17. Hederman Bros., Jackson, Mississippi.
- LUER, C. A. 1972. The native orchids of Florida. New York Botanical Garden, Bronx, New York.
- . 1975. The native orchids of the United States and Canada, excluding Florida. New York Botanical Garden, Bronx, New York.
- MCGREGOR, R. L., T. M. BARKLEY, R. E. BROOKS, AND E. K. SCHOFIELD. 1986. *Flora of the Great Plains*. Univ. Press of Kansas, Lawrence, Kansas.
- MORRIS, M. W. 1988. Noteworthy vascular plants from Grenada County, Mississippi. *Sida* 13: 177–186.
- RADFORD, A. E., H. E. AHLES, AND C. R. BELL. 1968. *Manual of the vascular flora of the Carolinas*. Univ. of North Carolina Press, Chapel Hill, North Carolina.
- ROBINSON, B. L. AND M. L. FERNALD. 1908. Gray's new manual of botany. American Book Company, New York, New York.
- SHEVIAK, C. J. 1982. Biosystematic study of the *Spiranthes cernua* complex. *Bulletin No. 448*. New York State Museum, The University of the State of New York, The State Education Department, Albany, New York.

- SMALL, J. K. 1933. Manual of the southeastern flora. Univ. of North Carolina Press, Chapel Hill, North Carolina.
- STEYERMARK, J. A. 1963. Flora of Missouri. The Iowa State Univ. Press, Ames, Iowa.
- VAN DER PIJL, L. AND C. H. DODSON. 1966. Orchid flowers: their pollination and evolution. Univ. of Miami Press, Coral Gables, Florida.